

REMARKS

Applicants have considered the Final Office Action mailed December 20, 2006, and respectfully request entry of the amendments and reconsideration of the application. Claims 7 and 13-29 have been withdrawn from consideration. Claims 1-3, 8, 9, and 11 have been rejected. Claims 7 and 13-29 are cancelled herein. After entry of the amendments, claims 1-3, 8-9, 11, and 30 are pending in the application.

In the Final Office Action, the Examiner withdrew the rejection of claims 1-3, 8, 9, and 11 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 13-15 and 17-29 were withdrawn from consideration as being drawn to non-elected inventions and claims 7 and 16 were withdrawn as being directed to a non-elected species. Claims 7 and 13-29 are cancelled in this amendment. Applicants reserve the right to pursue subject matter related to these claims in one or more divisional applications. Applicants submit that cancelling these claims puts the application in better condition for appeal or allowance and respectfully request that the Examiner enter the amendment.

Rejections under 35 U.S.C. § 112

Claims 1-3, 8, 9, and 11 have been rejected under 35 U.S.C. §112, first paragraph, as not complying with the enablement requirement. The Examiner relies on the reasoning presented in the non-final rejection mailed January 12, 2006, the final rejection, and the advisory action. Specifically, the Examiner states that an epoxy resin must contain at least two epoxy groups. Applicants respectfully traverse the rejection.

The test for enablement is whether the disclosure, when filed, enables a person skilled in the art to make and use the claimed invention without undue experimentation. (MPEP § 2164.01.) The enablement requirement is satisfied where the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the scope of the claim. (MPEP § 2164.01(b).) The Examiner bears the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention.

(MPEP § 2164.04.) The conclusion of enablement should focus on why the specification fails to teach (i) how to make and use the claimed invention (ii) without undue experimentation. (Id.)

Enablement is evaluated against the claimed subject matter, and the Examiner must consider the claim as a whole rather than analyzing its parts individually. (MPEP § 2164.08.) A rejection based on the scope of the claim relative to the scope of enablement requires evaluating whether a person skilled in the art could make or use the entire scope of the claimed invention without undue experimentation. (Id.) When evaluating the enabled scope, the teachings in the specification must not be ignored because claims are to be given their broadest reasonable interpretation that is consistent with the specification. (Id.)

The enablement rejection is based solely on the Examiner's interpretation or construction of the term "epoxy resin." The Examiner contends that the term "epoxy resin" should not encompass epoxides with only one epoxy group. Specifically, the Examiner contends that a component with a single epoxy group (i) does not conform to the art recognized definition, and (ii) is not capable of being converted to a thermoset.

Applicants respectfully submit that the Examiner has not met the burden to establish lack of enablement. The Examiner has not provided a reasonable basis in fact that the claims are not enabled. The Patent Office must explain why it doubts the truth or accuracy of a disclosure and back up its assertions with acceptable evidence that is contrary to the contested statement. (MPEP § 2164.04.) In the various rejections, the Examiner contends that the art recognized definition for an "epoxy resin" is an epoxide with two or more epoxy groups. The Examiner only relies on The Handbook of Epoxy Resins to support this position. (See April 21, 2006 Office Action, page 3.)

Applicants, however, have shown that this evidence does not demonstrate an art recognized definition for the term "epoxy resin." The definition of epoxy resin to which the Examiner refers in The Handbook of Epoxy Resins specifically states that "For the purpose of this book, an epoxy resin is defined as any molecule containing more than one α -epoxy group..." (emphasis added). The qualifying statement "for

the purpose of the book" indicates that it is not a generally accepted convention in the art that an epoxy resin would require at least two epoxy groups.

In response to previous Office Actions, Applicants have also provided evidence that is sufficient to overcome the Examiner's assertion that epoxy resins require at least two epoxy groups.¹ For example, The Concise Encyclopedia of Chemical Technology, Kirk-Othmer, 4th Ed. 1999, describes an epoxy resin as being "characterized by the presence of a three-dimensional ring known as the epoxy, epoxide, oxirane, or ethoxyline group" (emphasis added). That is, an epoxy resin may be characterized by the presence of a single epoxy group. There is no stated requirement for more than one epoxy group.

Additionally, Hawley's Condensed Chemical Dictionary, Twelfth Edition, 1993, does not define an epoxy resin as requiring at least two epoxy groups. Hawley's states that an "epoxy resin" is a resin that is "based on the reactivity of the epoxide group." Using the singular term "epoxide group" indicates that two or more epoxy groups are not required for an epoxy resin. Nothing in the definitions for "epoxide" or "epoxy resin" requires at least two epoxy groups.

Further, the portions from the Hawley's definition relied on by the Examiner in a previous Office Action do not undermine Applicants' evidence. The Examiner stated that "[t]he term epoxy resin is defined in the submitted Hawley's Condensed Chemical Dictionary (page 468, second column) as having 'glycidyl ether structures' and the epoxide group structure 'in the terminal positions,' thereby confirming the presence of at least two epoxy groups per molecule." (Advisory Action, July 10, 2006, page 2.) When these statements are viewed in full context, however, they do not support the proposition that all epoxy resins require at least two epoxy groups. Specifically, Hawley's states that:

One type [of epoxy resin] is made from epichlorohydrin and bisphenol A. Aliphatic polyols such as glycerol may be used instead of the aromatic bisphenol A. Molecules of this type have glycidyl ether structures... in the terminal positions, have many hydroxyl groups, and cure readily with amines.

(Emphasis added, structure omitted.)

¹ Copies of the discussed documents have been submitted in prior Responses and are not resubmitted with this Response.

That is, the Hawley's definition merely indicates that an example of an epoxy resin is one made from epichlorohydrin and bisphenol A (or aliphatic polyols), and that "molecules of this type," i.e., molecules of epichlorohydrin and bisphenol A (or aliphatic polyols), have terminal glycidyl ethers. This statement does not indicate that all epoxy resins must have at least two epoxy groups.

Thus, the evidence does not demonstrate an art recognized definition for epoxy resin that requires two epoxy groups. As described above, the evidence actually demonstrates that an epoxy resin may include a single epoxy group.

The Examiner now contends that the specification states that an epoxy resin is a compound containing more than one epoxy group capable of being converted to a useful thermoset or cured state by a curing agent. (See December 20, 2006 Final Office Action, page 3 (citing page 5, line 29 to page 6, line 1).) This passage, however, does not limit an epoxy resin to a compound containing more than one epoxy group. As Applicants have demonstrated in previous responses, when the specification is considered as a whole, the specification indicates that an epoxy resin may include structures or compounds with only one epoxy group. Specifically, the specification states that a wide variety of commercially available epoxy resins can be used in the invention and then includes octadecylene oxide, epichlorohydrin, styrene oxides, vinylcyclohexene oxides and glycidyl methacrylate in a list of suitable examples. (Specification, page 6, lines 29-30 through page 7, lines 1-25.) The Examiner can not ignore this teaching. (MPEP § 2164.08.) Therefore, when the specification is considered as a whole and the claims given their broadest reasonable interpretation that is consistent with the specification, the specification sets out with reasonable clarity that an epoxy resin may include structures with one epoxy group.

The enablement requirement is satisfied because the specification teaches how to make and use the claimed invention. The specification describes how to make the curable composition. For example, the specification states that the components of the curable composition may be blended at ambient or slightly elevated temperatures. (Specification, page 17, lines 8-10.) Further, the specification teaches how to use the curable compositions, e.g., how to cure them. (See, e.g., specification, pages 15-17; page 15, lines 11-20; page 17, lines 8-20.)

Thus, the specification discloses at least one method of making and using the claimed invention. Further, the disclosed method(s) bears a reasonable correlation to the scope of the claims in that nothing limits the method(s) to using any particular epoxy resin. Consequently, the enablement requirement is satisfied. (See MPEP § 2164.01(b).)

Moreover, the Examiner has not shown that undue experimentation would be required to practice the invention. An enablement rejection should focus on why the specification fails to teach how to make and use the claimed invention without undue experimentation. (MPEP § 2164.04.) A person skilled in the art would recognize that curing includes changing the physical properties of a material by a chemical reaction and/or heat. A single epoxy group is capable of reacting with a curing agent, and therefore capable of being cured (or converted to a cured state). As discussed above, the specification teaches how to make and use the invention that bears a reasonable relationship to the scope of the invention. There is nothing to suggest that undue experimentation would be required to practice the claimed invention.

Thus, the evidence, including the specification itself, demonstrates that an epoxy resin as used in the claims does not require more than one epoxy group. Moreover, there is nothing to suggest that undue experimentation would be required to practice the invention. Rather, in view of the specification, a person skilled in the art would have (i) known the scope of the claims, and been apprised that an epoxy resin can include readily available compounds including monoepoxides, and (ii) been able to make or use the full scope of the invention without undue experimentation. Thus, in view of the above discussion, Applicants respectfully request that the rejection of claims 1-3, 8-9, and 11 under 35 U.S.C. §112, first paragraph, be withdrawn.

Rejection Under 35 U.S.C. § 103

The Examiner rejected claims 1-3, 8, 9, and 11 under 35 U.S.C. § 103(a) as being unpatentable over Minamisawa et al. (U.S. Patent No. 4,500,660) and Japanese Patent No. 64- 01-060679. The Examiner maintained the rejection for reasons set forth in previous Office Actions. The Examiner contends that it would

have been obvious to formulate the compositions of Minamisawa and JP '679 "with the carboxy-terminated butadiene-acrylonitrile as a liquid at room temperature in order to facilitate blending of the components." (Office Action, September 1, 2006, page 4.) Applicants respectfully traverse this rejection.

In order to establish a prima facie case of obviousness three criteria must be met. First, there must be some suggestion or motivation or suggestion to modify the reference. Second there must be a reasonable expectation of success. And third, the prior art references must teach or suggest all the claim limitations. (MPEP § 2143.)

Minamisawa and JP '679 fail to teach all the claim limitations. In particular, neither Minamisawa nor JP '679 teach a curable composition employing at least one reactive liquid polymer comprising a carboxyl-terminated butadiene-acrylonitrile copolymer, which polymer is liquid at ambient temperature. Applicants have previously shown that the Nipol polymers disclosed by both Minamisawa and JP '679 are solids. Further, Minamisawa only discloses that suitable nitrile rubbers have a Mooney viscosity between 40 and 110 at 100°C. Thus, these references fail to teach or suggest using a carboxyl-terminated butadiene-acrylonitrile copolymer that is liquid at ambient temperature, and, therefore, fail to render the claims obvious.

In response to Applicants' arguments, the Examiner now contends that Minamisawa and JP '679 do not confine their polymers to any phase. In particular, the Examiner contends that Minamisawa discloses that a nitrile rubber such as a carboxyl-modified copolymer of butadiene and acrylonitrile with a Mooney viscosity of 40 and 110 at 100°C is suitable but not exclusive and the JP '679 report carboxy-terminated copolymers without any phase.

Applicants respectfully disagree with the Examiner's contention. What the reference teaches must be considered as a whole. There is nothing in the references to suggest to utilize at least one reactive liquid polymer that is ambient at room temperature. First, the Mooney viscosities disclosed in Minamisawa are measured at 100°C, which is well above ambient temperature. Second, as described above, the references only disclose Nipol polymers, which are solids. Thus, even if the references do not explicitly confine their copolymers to a particular phase, they do

not teach or suggest that the polymer should be a liquid at ambient temperature. To the contrary, Minamisawa and JP '679 teach that their compositions would have to be formed by blending the solid components at an elevated temperature. The fact that a reference could be modified does not render a claim obvious unless the prior art suggests the desirability of the modification. (MPEP § 2143.01(III).)

Further, Minamisawa's disclosure of dissolving the composition in a solvent does not render the claims obvious. Minamisawa discloses that an already formed epoxy composition may be used as a prepreg, which is produced by dissolving the already formed composition in a solvent and impregnating reinforcing fibers with that solution. ('660 patent, col. 6, lines 44-65.) The fact that the already formed resin may be dissolved does not teach or suggest that the resin composition comprises a reactive liquid polymer that is liquid at ambient temperature. Rather, it is only through prohibited hindsight in view of Applicants' disclosure that a person skilled in the art would arrive at the present claims.

Regarding claims 8 and 30, neither reference cited by the Examiner remotely teaches employing a reactive liquid polymer having a Brookfield viscosity of from about 500 to about 2,500,000 cps at 25°C. The Examiner contends that it would have been obvious to employ the polymers disclosed in liquid form with such viscosities to facilitate blending. Applicants disagree with this contention. First, the references completely fail to teach or suggest using a copolymer having a Brookfield viscosity with the recited range. Second, as described above, at the most, the references only teach using polymers that are solid or have a particular Mooney viscosity at 100°C. Thus, there is no teaching or suggestion to employ a liquid polymer having a Brookfield viscosity as recited in claims 8 and 30. The fact that a person skilled in the art could modify a reference is not sufficient to establish a prima facie case of obviousness. (MPEP § 2143.01(IV).) Therefore, claims 8 and 30 are not obvious in view of either Minamisawa or JP '697.

In view of the above discussion, Applicants submit that the combination of Minamisawa and JP '679 do not render the claims obvious. Applicants respectively request that the rejection under § 103(a) be withdrawn.

CONCLUSION

In view of the foregoing remarks and amendment, Applicants respectfully request reconsideration and a timely issuance of a notice of allowance for claims 1-3, 8-9, 11, and 30.

In the event any fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 under Attorney Docket No. **BFORP0313USB**. In the event an extension of time is needed to make the filing of this paper timely and no separate petition is attached, please consider this a petition for the requisite extension and charge the fee to our Deposit Account No. 18-0988.

In the event there are issues the Examiner would like to discuss with the Applicants' attorney, he is invited to contact the undersigned by phone.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By: 

Neil A. Duchene
Reg. No. 26,725

1621 Euclid Avenue
19th Floor
Cleveland, Ohio 44115-2191
(216) 621-1113

R:\SS\ab\GREP\0313USA\Response to 12-20-06 Final Office Action.doc